Project File Number: OU 4-12

EDF Serial Number: ER-WAG4-58

Functional File Number: N/A

ENGINEERING DESIGN FILE

Project/Task: OU 4-12 RI/FS

Subtask: Source Term Investigation

TITLE: CFA Landfills II and III; Potential of Radiological Waste

SUMMARY

The summary briefly defines the problem or activity to be addressed in the EDF, gives a summary of the activities performed in addressing the problem and states the conclusions, recommendations, or results arrived at from this task.

Attachments 1 through 7 discuss disposal practices at CFA Landfills.

Attachment 1:
Subject: STR Test Facility Industrial Hygiene Draft Policy #2 concerning disposal radioactive waste at NRF.
Date: September 18, 1953
From: F. S. Smith

Attachment 2:
Subject: Letter discussing NRF comments on a Industrial Hygiene and Safety Engineering Survey of NRF on December 10 and 11, 1963.
Date: March 23, 1964
From: NRF-Idaho Falls, Idaho, NRFTS-604
To: H. F. Herr, Bettis Atomic Power Laboratory

Attachment 3:
Subject: Letter evaluating handling of hazardous and radioactive materials.
Date: September 24, 1973
From: B. Charlson, Naval Reactors Facility, NRF-RS-RCE-39
To: H. T. Keller, Bettis Atomic Power Laboratory

Attachment 4:
Safety Anomaly Report, Aerojet Nuclear Company, documenting an incident of radiologically contaminated materials in Landfill II.
Date: July 15, 1975
From: G. R. Allred, Aerojet Nuclear Company
To: T. H. Stickley, Aerojet Nuclear Company

Attachment 5:
Subject: Memo of Conversation (Form EG&G-561) on landfill disposal practices including radiological controls.
Date: November 18, 1992
Interviewer: Steven H. McCormick, EG&G Idaho, Inc.
Interviewee: Jim Crandall, EG&G Idaho, Inc.

Attachment 6:
Subject: Memo of Conversation (Form EG&G-561) on disposal practices at NRF including chromates, boron, morpholine, and radioactive wastes.
Date: March 30, 1993
Interviewer: Steven H. McCormick, EG&G Idaho, Inc.
Interviewee: Dolf Sierre, Westinghouse Electric Corporation

EG&G Idaho, Inc.

FORM EGG-2631#

(Rev. 01-92)

Attachment 7: Subject: Memo on comment response for RI/FS Work Plan related to 56 cubic yards of radiologically contaminated soil shipped to the Radioactive Waste Management Complex from the Idaho Chemical Processing Plant. Copies of relevant pages from the Idaho Chemical Processing Plan Sampling and Analysis Plan for Operable Unit 3-07 Tank Farm Area, February 28, 1992 is attached. Date: April 1, 1993 From: Steven H. McCormick, EG&G Idaho, Inc. To: Greg Stormberg, EG&G Idaho, Inc.
Distribution (complete package): Distribution (summary page only):

Author / Dept.	Reviewed / Date	Approved / Date
Steve McCormick EG&G	W.J. Isle 9/21/94	9/26/94
	EG&G Review / Date	EG&G Approval / Date

Attachment 1

Subject: STR Test Facility Industrial Hygiene Draft Policy #2 concerning disposal radioactive waste at NRF.

Date: September 18, 1953

From: F. S. Smith

STR TEST FACILITY

INDUSTRIAL HYGIENE POLICY #2

Subject: Removal of Non-Contaminated Waste from Main Building and Pump House.

At the time of the removal of any non-contaminated waste from the main building and pump house areas, Industrial Hygiene is to survey the material for included radioactive or contaminated waste.

If radioactive or contaminated waste is found to be present all of the material in the container must be transferred to a contaminated waste can and handled as radioactive or contaminated waste.

If no radioactive or contaminated waste is found, the material may be loaded on the STR trucks and delivered to the STR burning pit.

F M Rauschenberg

F. S. Smith

Approved By Committee
9/18/58

RAD Liquid Waste - Policy

STR TEST FACILITY

INDUSTRIAL HYGIENE POLICY #5

Subject: Radioactive or Contaminated Solid Waste

Throughout all areas of the STR Test Facility where radioactive or contaminated materials are to be handled, there will be placed properly identified metal containers for the disposal of all materials known or suspected to be radioactive or contaminated.

Each container is to be monitored once a day by Industrial Hygiene. When a container is filled or reaches a radiation level of 7.5 mr/hr, the container will be removed by FS under direction of Engineering Industrial Hygiene to the Radioactive Waste Storage Area located at the north end of the main building. If a container becomes filled during any activity, contact Industrial Hygiene for its replacement.

Special containers will be provided for items to large for the standard ones.

When a load of waste containers has been accumulated in the Radioactive Waste Storage Area, Industrial Hygiene will contact the AEC Health Physics Group and make arrangements for transporting them to the NRTS disposal pit.

Prior to leaving the STR Test Facility, Industrial Hygiene will survey

each container and affix a Radiation Hazard Tag (Form AFD-31) denoting the amount of external radiation ~~from the can~~. The AEC Health Physics Group has requested that if:

(1) A container has a radiation level between 7.5 mr/hr and 50 mr/hr the driver and helper on the disposal truck should be notified.

(2) A container exceeds 50 mr/hr they would like to be notified at the time transportation arrangements are made.

Each shipment of radioactive or contaminated waste to leave the STR Test Facility is to be accompanied by a copy of the Radioactive Shipment Monitoring Record denoting the radiation level of each container

Radioactive or contaminated liquid waste is not to be placed in these containers (The operators of the waste disposal truck have instructions not to pick up any container containing a liquid.

(7)

W H Esselman —

F S Smith

Approved by I H + S.P. committee 9/18/53

Attachment 2

Subject: Letter discussing NRF comments on a Industrial Hygiene and Safety Engineering Survey of NRF on December 10 and 11, 1963.

Date: March 23, 1964

From: NRF-Idaho Falls, Idaho, NRFTS-604

To: H. F. Herr, Bettis Atomic Power Laboratory

Westinghouse

NRFTS - 604

BETTIS ATOMIC POWER LABORATORY
Bettis Site

Date: March 23, 1964
Bettis Atomic Power Laboratory

From: NRF—Idaho Falls, Idaho

H. F. Herr, Manager
Industrial Hygiene

Subject: NRF Comments on Industrial Hygiene and Safety Engineering Survey of NRF on December 10 and 11, 1963

cc: D. C. Spencer
J. E. Donnelly
T. A. Mangelsdorf

The following are NRF comments on the Industrial Hygiene and Safety Engineering survey of the NRF site on December 10 and 11, 1963:

1. Administrative Aspects

a. NRF has discontinued the use of the welding and burning permits for the following reasons:

(1) The NRF Safety Manual requires the responsible foreman to review all welding and burning work outside established shop areas.

(2) The Safety Manual requires the welder to survey the area before commencing to weld or burn. If combustible material is noted which cannot be removed or positively protected, a fire watch is required.

(3) A fire watch is required on every welding and burning operation in-hull.

(4) These permits were required out-hull and outside established shop areas but never in-hull. This resulting double standard created confusion.

These controls NRF considers adequate in the prevention of fires from welding and burning.

b. (1) The Safety Inspector program was instituted at NRF as a means of gaining safety coverage "over and above" that provided by safety organizations which normally exist. Safety inspections by these people are scheduled routinely, but it must be recognized that there are occasions when the primary duties, sickness or vacation preclude the accomplishment of an inspection. The Safety Engineers monitor and provide necessary "follow up" for this program. In addition, cognizant management is notified when a scheduled inspection is missed so appropriate action can be taken.

g. Section 8 of the ASME Unfired Pressure Vessels Code and Section 1.8.10 of the Idaho Boiler Safety Code exempt hot water heaters.

Present NPF inspection policies are consistent with the National Reactor Testing Station. However, our present program will be expanded to include an annual maintenance inspection of the safety devices on the hot water heaters and an annual inspection of other unfired pressure vessels by a commissioned inspector. The initial inspection will be completed prior to August 1, 1964.

h. The chemical analysis which specified the use of benzene is no longer required so this chemical has been removed from the site. Carbon tetrachloride is not available for common usage at NPF, but it is required in the chemical laboratories for specified parting analysis. NPF chemists realize that their profession requires them to handle hazardous chemicals on a routine basis, and they do exercise the necessary precautions.

NPF Safety will conduct semi-annual reviews for the more toxic chemicals and solvents in conjunction with the present weekly formal site inspection program. Records of these reviews will be kept.

i. The picric acid was disposed of as a hazardous chemical. There is no other picric acid at NPF.

j. The pumps which may become contaminated with mercury have been labeled to indicate the potential hazards associated with work on the pumps and necessary precautions. Personnel who work with this equipment have been instructed about the potential hazards of mercury and the precautions to be taken.

The Radiological Control and Safety group has mercury vapor detecting instruments which are used routinely to check the areas for the presence of mercury vapor.

k. The painters and the storeroom attendants who issue the equipment were instructed in the use of the proper respirator cartridges. This area will be routinely checked by the Safety Engineers during the area surveys presently conducted.

Urine samples of all painters have been analyzed for lead by ID Health and Safety Analysis Branch. None of the painters were excreting any significant amount of lead, $< .01$ mr.

l. The proper eye protection is supplied to the personnel who require it for working around welding and for other types of eye hazards. The emphasis on eye protection and the instruction in proper use of eye protection is a continuing program.

Attachment 3

Subject: Letter evaluating handling of hazardous and radioactive materials.

Date: September 24, 1973

From: B. Charlson, Naval Reactors Facility, NRF-RS-RCE-39

To: H. T. Keller, Bettis Atomic Power Laboratory

NRF-RS-RCE-39

BETTIS ATOMIC POWER LABORATORY
Bettis Site

Mr. H. T. Keller, Manager
OPS Engineering

cc: Mr. C. A. Bergmann - Bettis
Mr. H. A. Clawson - Bettis
Mr. J. D. Cohen
Mr. G. G. Cousins
Mr. D. E. Doncsecz
Mr. J. A. Logan
Mr. T. F. Pointer
Mr. M. S. Vargo
Mr. J. J. Volpe - Bettis
Mr. M. W. Walcher
Mr. B. D. Withers
Mr. O. J. Woodruff - Bettis

From : BAPL - NRF - Idah
WIN : N/A
Date : September 24, 1973
Subject: Handling of Environmentally Hazardous Materials at NRF

Reference: W. H. Hamilton Memorandum - Dated September 4, 1973

This letter forwards results of an investigation at NRF to evaluate the capability of NRF to safely handle environmentally hazardous material to comply with the reference. Specifically, this letter contains general discussions and recommendations and the attachment to this letter provides detailed information. The format of both the letter and the attachment was drafted to be consistent with Bettis' plans to submit similar data.

Initially, it should be recognized that the Naval Reactors Facility is located well within the boundary of the National Reactor Testing Station. Liquid effluents that leave the perimeter fence of NRF remain on the National Reactor Testing Station grounds and do not reach State grounds. This fact does exempt NRF from Idaho State environmental codes; however, environmental protection efforts are exercised at NRF to meet these State codes.

Operations at the Naval Reactors Facility were reviewed by an engineering task force to determine NRF's capability to handle environmentally hazardous material. The two potentially affected environments considered were the underground water table and the surrounding desert biosphere. All potentially hazardous materials in use at NRF, as defined by Idaho code, were considered and are discussed in the following text. The most likely environmental contamination at NRF would probably result from the handling of bulk acid and caustic used for NRF water treatment.

The source document used to define environmentally hazardous materials at NRF are the Proposed Rules and Regulations for the Establishment of Standards of Water Quality and for Wastewater Treatment Requirements for Waters of the State of Idaho. These rules were prepared by the Idaho Board of Environmental and Community Services, revised March, 1973 and defines the following standar for water quality for Idaho State waters:

"The following general water quality standards will apply to waters of the State, both surface and underground, in addition to the water quality standards set forth for specifically classified waters. Waters of the State shall not contain:

A. Toxic chemicals of other than natural origin in concentrations found to be of public health significance or to adversely affect the use for which the waters have been classified. Guides such as the Water Quality Criteria published by the State of California Water Quality Control Board (second Edition, 1963) and more recent research papers will be used in evaluating the tolerances of the various toxic chemicals for the use indicated.

B. Deleterious substances of other than natural origin in concentrations that cause tainting of edible species of fish, or tastes and odors to be imparted to drinking water supplies.

C. Radioactive materials or radioactivity other than of natural origin which:

1. Exceed 1/30th of the MPC_w values given for continuous occupational exposure in the National Bureau of Standards Handbook No. 69. In addition, concentrations of the following radionuclides shall not exceed 1/30th of the MPC values given in Column 2, Table I, Appendix A, Part C, Rules and Regulations for the Control of Radiation in the State of Idaho as amended:

^{125}I, ^{240}U, ^{243}Pu, ^{244}Pu, ^{242m}Am, ^{242}Am, ^{244}Am, ^{247}Cm, ^{248}Cm, ^{249}Cm, ^{250}Bk, ^{251}Cf, ^{253}Cf, ^{253}Es, ^{254}Cf, ^{254}Cf, ^{254m}Es, ^{254}Es, ^{255}Es, ^{254}Fm, ^{255}Fm, and ^{256}Fm.

2. Exceed the concentrations specified in the 1962 U. S. Public Health Service Drinking Water Standards for waters used for domestic supplies.

3. Have a demonstrable detrimental effect on aquatic life. The concentration of radioactive materials in these waters shall be less than those required to meet the Radiation Protection Guides for maximum exposure of critical human organs recommended by the former Federal Radiation Council in the case of foodstuffs harvested from these waters for human consumption.

D. Floating or submerged matter not attributable to natural causes.

E. Excess nutrients of other than natural origin that cause visible slime growths or other nuisance aquatic growths.

F. Visible concentrations of oil, sludge deposits, scum, foam or other wastes that may adversely affect the use indicated.

G. Objectionable turbidity which can be traced to a man-made source."

At present NRF has no program or system which discharges directly to the Idaho water table or to any surface water as discussed in the introduction paragraphs. Large

quantities of waste cooling water and water purification resin recharging waste are discharged to a long ditch which is considered as a land treatment facility. This waste consists of highly diluted sulfuric acid, sodium hydroxide, sodium chloride, and various water treatment chemicals of proprietary formulation supplied by the Betz water treatment firm. The water treatment chemicals contain only phosphates, silicates and organically derived compounds, none of which, as used at NRF, are considered hazardous to the environment.

Several toxic materials were identified to be in use in small quantities at NRF. These materials, such as cyanides, potassium permanganate, hydrazine, commercial solvents and thinners and chemical reagents are rigidly controlled and used only by qualified personnel. In addition, the quantity of these materials is limited to a minimum amount. These toxic materials are, therefore, not considered to present a potential hazard to the environment or public health.

Sewage waste and a limited quantity of boiler chemical waste are discharged to a sewage lagoon which has a sealed bottom. This sewage lagoon is constructed to meet the requirement for a land treatment facility as specified by Idaho Code. All discharges to this facility are in compliance with Idaho Code.

Mercury compounds used in chemical analyses are controlled at the point of use according to written procedure and do not enter the drain systems either in-hull or out-hull.

Bunker oil is used in bulk quantities for steam generation. The storage facility is in a diked enclosure and in the case of a spill during transfer the oil could be controlled and readily cleaned up. Lubricating oil is received in 55-gallon drums at the plants and if one of these should spill it could be easily cleaned up using locally available materials, without introducing the lube oil to the environment.

As at the Bettis Site, the control of Radioactive Materials at NRF has been the subject of extensive evaluations and improvements. All radioactive materials at NRF are handled in strict compliance with standing procedure by trained and qualified personnel. Facilities, equipment, and procedures for handling radioactive material are routinely reviewed and evaluated for adequacy and improvements. Radiation worker personnel are routinely audited and periodically trained, tested, and qualified to maintain high standards of proficiency for handling radioactive materials. In summary, the control of radioactive materials at NRF is considered satisfactory.

To ascertain that large bulks of radioactive liquid at NRF were under satisfactory control, NRF reviewed it's main storage facilities of radioactive contaminated water. These storage facilities are the ECF water pits, A1W, S1W, and S5G Radioactive Waste Disposal Systems holding tanks, and the A1W quench tanks. The ECF water pits are below ground level construction and any leakage would be quickly detected by routine shift readings of the water pit levels and contained within the confines of ECF. Any leakage of the prototype Radioactive Waste Disposal Systems and the A1W quench tanks would also be contained within the confines of the respective prototypes. NRF, therefore considers radioactive materials at NRF as adequately controlled.

Sulfuric acid is used at all three prototypes for treatment of circulating cooling water to prevent scale. Sulfuric acid and caustic soda are used at ECF to regenerate ion exchange resins in the water demineralizing facility. Handling, storage and use of these chemicals at each facility were reviewed in detail by the task force. Contamination of the local desert environment could result by accidental bulk discharge via the sewer or industrial drains to the ditch used for waste disposal. Even in the worst case, contamination would be limited in extent and capable of being corrected.

Handling of bulk acid and caustic at NRF was studied in considerable detail by the task force and the results of this study are included in the attachment. The following actions at the NRF Site are recommended:

1. All acid unloading areas require upgrading to assure that a major acid spill would be directed away from the truck and equipment to an adequate retention area.

2. All areas require upgrading of safety equipment - especially clothing storage and availability of neutralizers.

3. All areas require upgrading of procedures for unloading and training and qualification of technicians in acid safety.

4. A casualty procedure for a major chemical spill is required and backup emergency equipment such as neutralizer and acid pump must be procured.

The above recommendations are discussed in detail with specific recommended corrective actions in the attachment.

B. Charlson

B. Charlson, Manager
Naval Reactors Facility

REDeKlotz/tr

Attachment 4

Subject: Safety Anomaly Report, Aerojet Nuclear Company, documenting an incident of radiologically contaminated materials in Landfill II.

Date: July 15, 1975

From: G. R. Allred, Aerojet Nuclear Company

To: T. H. Stickley, Aerojet Nuclear Company

Bob —
I know that [illegible] may have been the guilty one. Please check out and prepare letter to violator if it can be determined — otherwise use the letter [illegible]

~~WMT~~ Z-10

AEROJET NUCLEAR COMPANY

SAFETY ANOMALY REPORT

Facility Central Facility Area Date of Anomaly July 8, 1975

Report No. SD-75-17 Time of Anomaly 1600

Subject (short title) Contamination and Direct Radiation in Sanitary Landfill

1. Verbally reported Steve Farkas of ID-OS: Date 7-10-75 Time 1500

2. Description of Anomaly: Four poly bags containing contaminated latex gloves, cotton gloves, shoe covers and assorted trash up to 2000 c/m. Also radiation signs and a source reading 20 mR/hr encapsulated check source. Some of the gloves were run on the spectrometer and the main isotope was Co^{60} with small amounts of Cs^{137}.

3. Basic Failure: Design ____; Materiel ____; Personnel X; Procedure X

4. Immediate Evaluation; Corrective Action Taken; Results: Contaminated materials were collected in poly bags and sent to RWMC, source determined to be Ra-226.

5. Is Further Evaluation and/or Action Needed? Yes X No ____

   If "Yes", Before Further Operation? Yes ____ No X By Whom? Waste Management

6. Further Evaluation: Waste Management should send a letter to users of the landfill reminding them of proper handling procedures of radioactive waste. Investigation didn't establish a violator, however, there are two suspects.

7. Permanent Corrective Action: Taken ____ Recommended X

   Action Assigned to: T. H. Stickley By RBO

Originated by S. R. Allred
CF HP Supervisor
Date 7-11-75

Approved by R. B. O'Brien
Director, Safety Division
Date 7-15-75

cc: BRBaldwin
RJBeers - ID (3)
JLClark
JRFielding
WWHickman
JWMcCaslin /r/ DHN
ALOlsen
NGReece
THStickley

[illegible]
7/30/75

Attachment 5

Subject: Memo of Conversation (Form EG&G-561) on landfill disposal practices including radiological controls.

Date: November 18, 1992

Interviewer: Steven H. McCormick, EG&G Idaho, Inc.

Interviewee: Jim Crandall, EG&G Idaho, Inc.

EG&G Idaho, Inc.

Form: EG&G-561

MEMO OF CONVERSATION

Person Calling: Steve McCormick — Date: November 18, 1992

Representing Org: WAG 4 — Time:

Person Called: Jim Crandall — Phone No. 526-8120

Representing Company: CFA Landfills, EG&G Idaho, Inc.

Subject: Disposal practices at CFA Landfill II & Landfill III (closed portion).

Questions on past disposal practices were raised upon review of the INWMIS data for Landfills II and III. These were passed on to the current manager of the landfills, Jim Crandall, in a profs note dated 11/19/92. Mr. Crandall has been employed at INEL for 33 years. He has been manager of the landfills since August 1989 when responsibility for facility operations was shifted from Central Facilities Area to the Waste Management Department. His comments are from his own experience at landfills and interviews with individuals employed at the landfills.

Question: What efforts were made to ensure that radiological waste was not included in shipments to the landfills? We know that the landfills were not used for RAD waste but how were the loads checked, if at all?

> Each INEL facility had its own procedures for radiological screening of waste before it was allowed to leave the facility. Before August 1989 waste entering the landfill would have been admitted to the without further radiological survey. It was assumed that the facility screening was adequate to prevent entry of radiological waste into the landfill. In August 1989 the landfills have employed a full time radiological controls technician to conduct radiological surveys of all waste entering the landfills. This practice was implemented to stop shipments (approximately 1 per month) of waste which contained low levels of radiological contamination.

Question: Several entries in INWMIS indicate paint thinners and solvents were disposed in the landfills. Were these wastes disposed of in drums/containers or dumped on the ground?

> Liquid wastes of this type were disposed of in drums/containers and dumped directly on the ground. Where there was a spill of liquids at a facility (ie., chromate solutions) the accepted practice during this period was to solidify waste using absorbants such as kitty litter and rags. These could have been dumped directly on the ground or disposed of in containers.

Question: As a general rule was all asbestos put in boxes and stored in one area?

> Asbestos was not always boxed. Prior to 1989 it was generally double bagged and placed in a common area in the landfill.

Question: Is there any original documentation, such as manuals, directives, waste acceptance criteria, etc. from that period?

> There is no documentation available according to Mr. Crandall. Prior to August 1989 the landfills were operated as dumps that did not require extensive documentation.

Steve McCormick 11/18/1994

Attachment 6

Subject: Memo of Conversation (Form EG&G-561) on disposal practices at NRF including chromates, boron, morpholine and radioactive wastes.

Date: March 30, 1993

Interviewer: Steven H. McCormick, EG&G Idaho, Inc.

Interviewee: Dolf Sierre, Westinghouse Electric Corporation

EG&G Idaho, Inc.

Form: EG&G-561

MEMO OF CONVERSATION

Person Calling: Steve McCormick — Date: March 30 & April 1, 1993

Representing Org: WAG 4 — Time:

Person Called: Dolf Sierre — Phone No. 533-5022

Representing Company: WAG 8, Naval Reactors Facility

Subject: Disposal practices at CFA Landfill 2 & Landfill 3 (closed portion).Telephone Conversation

Subject: Wastes from NRF disposed in CFA Landfill 2

I discussed the shipments of chromate and boron solutions with Dolf during 2 phone calls. Dolf reviewed archived information from the early 1970's on shipments of waste. He read from several letters dated 1973, 74 and 75 which discussed shipments and handling of radioactive and nonradioactive wastes. He also read from a shipping form which was used for shipments in the early 1970's. I requested copies of the letters and other information from Dolf. He said that he would need to clear it with Rick Nieslanic, WAG 8 Manger before sending the information. The discussion is summarized below.

Chromates were used in secondary cooling loops of reactors. They were also used in other water treatment systems which were not associated with reactors. The concentration of chromium in water was approximately 10 to 14 ppm (mg/l). Shipments of chromate solutions would have been nonradiologically contaminated water containing chromium which was used in the secondary cooling loop. It would have been absorbed using kitty litter (diatomaceous earth) and placed in drums before shipment to the landfill. Dolf was not aware of the uses of boron solutions at NRF and referred me to Jeff Fraizier who is researching past operations and facilities at NRF.

Procedures existed at NRF during this era to segregate radioactive waste from nonradioactive waste. Radioactive waste would have been treated or stored at NRF or RWMC and would not have been shipped to CFA landfills. Letters and shipping forms indicated that procedures were followed to ensure that radioactively contaminated waste was sampled or surveyed before leaving NRF.

Additional Information

Boron and morpholine are referenced in the MERC Index (pages attached). It is known that boron is used in nuclear reactors as a nuetron absorber for criticality control. Boron was likely used in the primary cooling loop or in a fuel storage pool. The boron was probably in the form of boric acid when disposed at CFA Landfill 2. Also, the NIOSH Manual indicates that the primary route of exposure is inhalation of dust contaminated with boric acid.

Steve McCormick 4/1/93

Attachment 7

Subject: Memo on comment response for RI/FS Work Plan related to 56 cubic yards of radiologically contaminated soil shipped to the Radioactive Waste Management Complex from the Idaho Chemical Processing Plant. Copies of relevant pages from the *Idaho Chemical Processing Plan Sampling and Analysis Plan for Operable Unit 3-07 Tank Farm Area*, February 28, 1992 is attached.

Date: April 1, 1993

From: Steven H. McCormick, EG&G Idaho, Inc.

To: Greg Stormberg, EG&G Idaho, Inc.

Memo

From: S.H. McCormick, WAG 4

To: G.J. Stormberg

Date: April 1, 1993

Subject: OU4-12 Work Plan Comment Response (comment #19a)

Attached are pages from the *Idaho Chemical Processing Plan Sampling and Analysis Plan for Operable Unit 3-07 Tank Farm Area*, (February 1992) and shipping records from the Radioactive Waste Information System (RWMIS).

The comment was taken from the second to last paragraph on first page of the document. It says "During excavation for encasement and pipe inspection, approximately 56 cu yd of contaminated soil containing approximately 3000 curies of radionuclides were segregated from noncontaminated soil, packaged, and hauled to the INEL Central Radioactive Waste Disposal and Storage Area (RWDSA)".

The INEL Central Radioactive Waste Disposal and Storage Area refers to the Radioactive Waste Mangement Complex (RWMC).

The RWMIS records several shipments of radioactively contaminated soil from April 26, 1977 to August 26, 1977. This period of time coincides with construction of the tank farm membrane. It is assumed that the soil was boxed and shipped during this period.

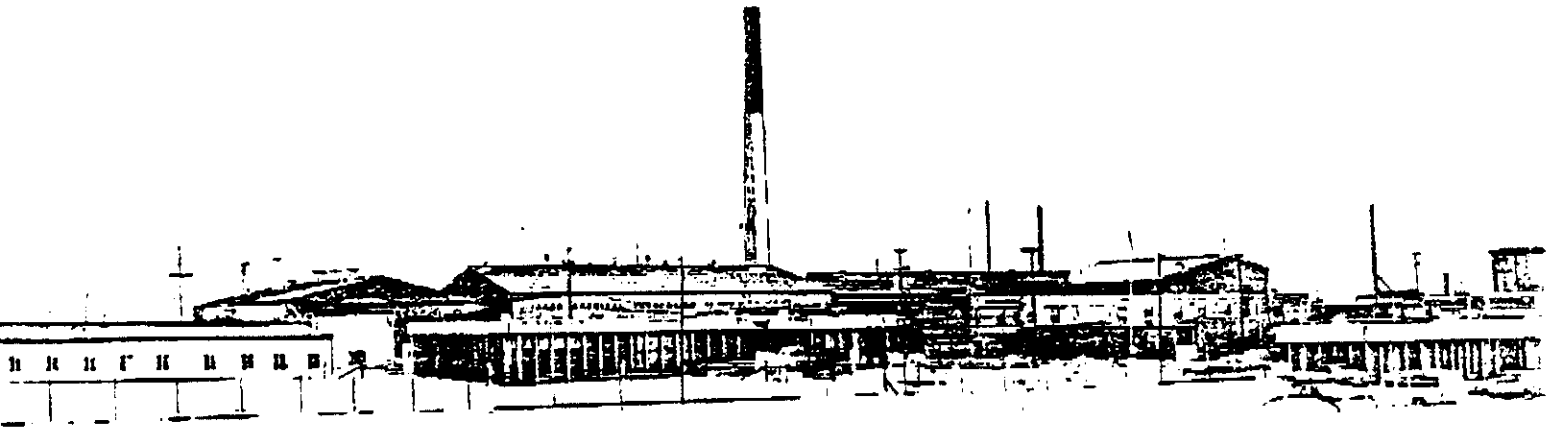
The RWMIS records also indicate that the contaminated soil was generated at CPP 628 which is the Tank Farm Control House. It is assumed that the generating area or building was designated CPP 628.

Scott McCormick 4/1/1993

Post-it™ brand fax transmittal memo 7671	# of pages ▸ 4
To Steve McCormick	From C. Mascareñas
Co.	Co.
Dept.	Phone # 5-0553
Fax # 5-5960	Fax #

February 28, 1992

IDAHO CHEMICAL PROCESSING PLANT SAMPLING AND ANALYSIS PLAN FOR OPERABLE UNIT 3-07 TANK FARM AREA



Westinghouse Idaho Nuclear Company, Inc.

Idaho Falls, Idaho 83403

Prepared For The

DEPARTMENT OF ENERGY

FIELD OFFICE, IDAHO UNDER CONTRACT DE-AC07-84ID12435

CPP-28

C 631

ICPP TANK FARM CONTAMINATED SOIL INVESTIGATION

I. INTRODUCTION

A. SUMMARY

On October 1, 1974, during the course of drilling operations in connection with an upgrade construction project for the ICPP cathodic protection system, contaminated soil reading up to 40 R/hr (primarily Cs-137, Ru-106, Ce-144, and Sr-90) was encountered at a location point identified as anoda I-42, approximately 10 ft south of the concrete vault which houses liquid waste storage tank WM-181 (Figure 1) and at an elevation of 6 ft 5 inches below grade level. Subsequent tests proved the source of contamination to be from an encased underground pipeline located 5 ft 5 inches south of anode I-42 (Figure 2) and at an elevation approximately 7 ft below grade level. This line was used for transfer of high-level-radioactive, liquid-waste solutions from the recovery process to the underground liquid waste storage tanks in the Tank Farm area.

A section of the pipeline and encasement was removed for inspection, and it was found that during the original construction in 1955, a 1/8-inch diameter hole had been inadvertently drilled through one side of the 3-inch stainless steel pipe at approximately the horizontal center line. It is apparent that the hole had been drilled after the pipeline had been pressure-tested and during installation of the upper section of the split-steel pipe encasement. Further metallurgical inspection of pipe and weld sections indicated no significant corrosion damage in the pipe.

Location of the hole in the pipe was such that leakage did not occur until the pipe reached a 50%-full level, a condition achieved only when it was neglected to open pertinent block valves downstream from the hole at the time a liquid waste transfer was initiated through this pipeline. Normally, leakage through the 1/8-inch hole would have been contained within the pipe encasement and conducted into downstream collection sumps. However, inspection indicated the encasement to be in a state of deterioration and partially filled with soil. The damming effect of the soil in the encasement caused sufficient liquid backup for the flow outward through the joints of the encasement and into the surrounding soil.

During excavation for encasement and pipe inspection, approximately 50 cu yd of contaminated soil containing approximately 3000 curies of radionuclides were segregated from noncontaminated soil, packaged, and hauled to the INEL Central Radioactive Waste Disposal and Storage Area (RWDSA).

Eleven test pipes were driven into the area of soil contamination to depths up to 20 ft and a radiation-detection probe inserted in these pipes at various depths to log and define the zone of contamination below the pipe encasement. It was found that the area of remaining

was made to verify all valves were open. At that time the job supervisor noted that a hose coupling on the decontamination header was leaking, and all steam to the system was turned off. It was determined that the steam escaping from the hose coupling was radioactive and efforts were made to close the associated decontamination valve. Line valves were positioned to vent the steam in the line being decontaminated to one of the storage tanks, so an operator could approach the decontamination header and close the decontamination valve. Liquid dripped from the hose coupling for several hours.

Because of strong winds at the time of the incident, an area of 3 acres inside the ICPP fence and 10 acres outside the fence were contaminated by the steam. It should be noted that the boundary fence at the time of the release was different than its current location. Approximately one acre of the release site lies outside the present ICPP fence.

2.1.2.3 Source/Chemicals of Concern

The source of the contamination was a hose coupling failure which released HLLW contaminated steam to the atmosphere. The contaminated steam caused widespread surface radioactive contamination. The contaminants of concern associated with steam release are: Pu^{242}, Ru^{103}, Ru^{106}, Ce^{144}, Cs^{134}, Cs^{137}, and heavy metals.

2.1.3 CPP-28 (Contaminated soil in Tank Farm Area south of WM-181, by valve box A-2)

2.1.3.1 Location

CPP-28 is located in the tank farm area south of tank WM-181 (Figure 2-1).

2.1.3.2 Description of Event

On October 1, 1974, during the installation of a cathodic protection electrode in the tank farm area, highly radioactive contaminated soil (up to 40 R/hr) was discovered by a subcontractor at a depth of 6 feet.

An investigation review team was assembled to identify the cause of this contamination. In their final report they state that the contamination was the direct result of a .15 inch hole having been drilled, apparently while installing the two piece containment sleeve in 1955, into the 3" transfer line, PWA-1005. This hole allowed for the occasional direct release of high level waste to the secondary containment. This concentrated acidic waste corroded the carbon steel upper portion of the containment which allowed liquids to contaminate the soil.

Starting on October 22, 1976 excavation of material to locate the source of the contamination was initiated. A total of 56 yd^3 of radioactively contaminated soil was removed, drummed, and sent to the INEL Central Disposal Area for disposition. Based on past "observation well" data reports it is estimated that 5 yd^3 of highly contaminated soil remain in place at this site.

In general, "observation wells" are pipes that are either driven into the subsurface or installed after drilling a borehole, for the purpose of radiation monitoring in the subsurface. Radiation probes are lowered down the pipe and readings are taken at 2 foot (sometimes 1 foot) intervals to establish a vertical radiation profile for each "observation well." Figure 2-3 shows the location of the "observation wells" (previously plugged and abandoned) at site CPP-28. The hatched area represents the areal extent of contaminated soil, as derived from radiation profiles. These profiles show the greatest radiation level to be 90 R/hr (90,000 mR/hr) at 8' below ground surface (bgs) (Table 2-1). The main contamination zone is from approximately 6' to 9'. Since the excavation at this site only went down to 7' (depth of pipe section removed), the greatest levels of radioactively contaminated soil still remain at this location.

2.1.3.3 Source/Chemicals of Concern

The high level concentrated acidic waste may have contained radionuclides, metals, acids, and trace volatile organic compounds. Radionuclides of concern are Cs-134, Cs-137, Ru-106, Ce-144, Sr-90, Eu-154, Eu-155, Mn-54, and Co-60. Hazardous constituents of potential concern are heavy metals and fluoride.

2.1.4 CPP-31 (Contaminated soil in Tank Farm area south of tank WM-183)

2.1.4.1 Location

CPP-31 is located in the tank farm area, south of tank WM-183 near valve boxes A-5 and A-6 (Figure 2-1).

2.1.4.2 Description of Event

On September 18, 1975, while drilling an "observation well" located southwest of HLLW tank WM-183, contaminated soil was brought to the surface. Members of Allied Chemical Corporation and ERDA-ID management were notified of the discovery and additional "observation wells" (many have since been plugged and abandoned) were installed to determine the extent of contamination. The zone of contamination was determined to be located 13 feet to 20 feet below grade. It was estimated that 600-800 cubic yards of soil have been contaminated by this release.

The apparent cause of contamination was failure of an unused carbon steel line (3" WRN-1037), due to high-level acidic waste entering through a

RMMIS (P61SH021) PRINTOUT FOR CPP WASTE DISPOSED AT RMMC
FROM 10/20/76 TO 12/31/77 USING PROGRAM STEVE3 RUN ON 03/24/93
SEARCHING FOR CONTAMINATED SOIL THAT WENT TO RMMC

GENERATING AREA/BUILDING	DISPOSAL DATE	SHIPMENT DESCRIPTION	GROSS VOLUME CUBIC METERS	GROSS CURIES	WASTE DESCRIPTION
CPP628	04/26/77	HOT SOIL	3.738E+00	6.700E+01	CONTAMINATED SOIL
	07/08/77	HOT DIRT	2.803E+00	2.280E-01	CONTAMINATED SOIL
		HOT-DIRT	3.738E+00	4.320E+00	CONTAMINATE SOIL
	*		6.541E+00	4.548E+00	
	07/13/77	HOT SOIL	2.803E+00	1.200E+00	CONTAMINATED SOIL
		HOT-DIRT	2.803E+00	5.400E+00	CONTAMINATED SOIL
	*		5.606E+00	6.600E+00	
	07/15/77	HOT DIRT	1.869E+00	5.220E-01	CONTAMINATED SOIL
		HOT-SOIL	2.803E+00	2.000E+00	CONTAMINATED-SOIL
	*		4.672E+00	2.522E+00	
	07/19/77	HOT DIRT	2.803E+00	9.000E-01	CONTAMINATED SOIL
	07/20/77	HOT DIRT	2.803E+00	1.200E+00	CONTAMINATED SOIL
	07/21/77	HOT SOIL	2.803E+00	9.000E-01	CONTAMINATED SOIL
			3.738E+00	2.940E-02	CONTAMINATED SOIL
		*	6.541E+00	9.294E-01	
	*		6.541E+00	9.294E-01	
	07/22/77	HOT SOIL	2.803E+00	1.200E-01	CONTAMINATED SOIL
	07/25/77	HOT SOIL	2.803E+00	1.200E-02	CONTAMINATED SOIL
		HOT-DIRT	2.803E+00	1.050E-01	CONTAMINATED-SOIL
	*		5.606E+00	1.170E-01	
	07/26/77	HOT-DIRT	2.803E+00	2.160E-01	CONTAMINATED SOIL
	07/28/77	HOT SOIL	3.738E+00	1.620E+01	CONTAMINATED SOIL
	07/29/77	HOT SOIL	2.803E+00	2.500E+00	CONTAMINATED SOIL
	08/02/77	HOT DIRT	2.803E+00	1.250E-01	CONTAMINATED SOIL
			2.803E+00	3.250E-01	CONTAMINATED SOIL
		*	5.606E+00	4.500E-01	

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FROM 10/20/76 TO 12/31/77 USING PROGRAM STEVE3 RUN ON 03/24/93
SEARCHING FOR CONTAMINATED SOIL THAT WENT TO RMMC

GENERATING AREA/BUILDING	DISPOSAL DATE	SHIPMENT DESCRIPTION	GROSS VOLUME CUBIC METERS	GROSS CURIES	WASTE DESCRIPTION
	*		5.606E+00	4.500E-01	
CPP628	08/05/77	HOT DIRT	2.804E+00	1.800E-01	CONTAMINATED SOIL
			2.804E+00	1.200E-01	CONTAMINATED SOIL
		*	5.608E+00	3.000E-01	
	*		5.608E+00	3.000E-01	
	08/19/77	HOT SOIL	3.625E+00	1.590E+00	CONTAMINATED SOIL
	08/26/77	HOT SOIL	2.803E+00	8.598E+00	CONTAMINATED SOIL
			2.803E+00	4.500E-01	CONTAMINATED SOIL
		*	5.606E+00	9.048E+00	
	*		5.606E+00	9.048E+00	
*			7.090E+01	1.142E+02	
CPP630	11/18/76	SOIL MET WOOD	4.332E+00	6.750E-02	CONTAMINATED DIRT
			7.523E+01	1.143E+02	